

Ellipses Worksheet

Sketch the graph of each ellipse. Identify the center, foci, vertices, and the co-vertices.

1. $\frac{x^2}{25} + \frac{y^2}{4} = 1$

2. $\frac{x^2}{1} + \frac{y^2}{9} = 1$

3. $\frac{x^2}{4} + \frac{y^2}{9} = 1$

4. $\frac{(x+2)^2}{4} + \frac{(y+1)^2}{9} = 1$

5. $\frac{(x-2)^2}{9} + \frac{(y-2)^2}{4} = 1$

6. $\frac{x^2}{1} + \frac{(y+2)^2}{9} = 1$

7. $\frac{(x-1)^2}{4} + \frac{(y-3)^2}{4} = 1$

8. $16(x+1)^2 + 9(y-1)^2 = 144$

9. $9(x-1)^2 + 25(y+2)^2 = 225$

10. $4x^2 + 25y^2 = 100$

Write the standard equation for the ellipse with the given characteristics.

11. Foci: (5, 0), (-5, 0) Vertices: (9, 0), (-9, 0)

12. Foci: (7, 0), (-7, 0) Co-Vertices: (0, 3), (0, -3)

13. Vertices: (5, 0), (-5, 0) Co-Vertices: (0, 4), (0, -4)

14. The major axis is 16 units long and parallel to the x-axis. The center is (5, 4) and the minor axis is 9 units long.

15. The endpoints of the major axis are at (2, 12) and (2, -4). The endpoints of the minor axis are at (4, 4) and (0, 4).

16. The major axis is 12 units long and parallel to the y-axis. The minor axis is 8 units long and the center is at (-2, 3).

17. The endpoints of the minor axis are at (-2, 5) and (-2, -1). The endpoints of the major axis are at (-9, 2) and (5, 2).

Write the standard equation for each ellipse. Identify the coordinates of the center, vertices, co-vertices, and foci.

18. $x^2 + 4y^2 + 6x - 8y = 3$

19. $16x^2 + 4y^2 + 32x - 8y = 44$

20. $x^2 + 16y^2 - 64y = 0$

21. $25x^2 + y^2 - 50x = 0$

22. $4x^2 + 9y^2 - 16x + 18y = 11$

23. $25x^2 + 9y^2 + 100x + 18y = 116$

24. $9x^2 + 16y^2 - 36x - 64y - 44 = 0$

25. $36x^2 + 25y^2 - 72x + 100y = 764$

26. $7x^2 + 3y^2 - 28x - 12y + 19 = 0$

27. $16x^2 + 25y^2 + 32x - 150y = 159$

28. Mars orbits the Sun in an elliptical path whose minimum distance from the Sun is 129.5 million miles and whose maximum distance from the Sun is 154.4 million miles. The Sun represents one focus of the ellipse. Write the standard equation for the elliptical orbit of Mars around the Sun, where the center of the ellipse is at the origin.

29. A satellite is in an elliptical orbit with the center of Earth at one focus. The major axis of the orbit is 28,900 miles long and the center of the Earth is 8000 miles from the center of the ellipse. Assuming that the center of the ellipse is the origin and the foci lie on the x-axis, write the equation of the path of the satellite.

30. The moon orbits Earth in an elliptical path with the center of the Earth at one focus. The major axis of the orbit is 774,000 kilometers, and the minor axis is 773,000 kilometers. Using (0, 0) as the center of the ellipse, write the standard equation for the orbit of the Moon around Earth. How far from the center of Earth is the Moon at its closest point? How far from the center of Earth is the Moon at its farthest point?